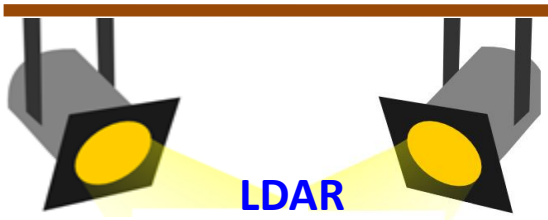
NEXA PSM engage 2018 4

NEXA Process Safety Engineers



The whole World is celebrating "5th June 2018" as world Environment Day and being a part of our Green Social Responsibility, we are committed towards making our Planet Earth Cleaner and Greener place for living. Our this newsletter is focusing on "LDAR" : The Green Effect Initiatives companies can focus for the sustainability and future of our Planet Earth.

What is Leak Detection And Repair (LDAR) ?

LDAR is a **work practice that is designed to identify leaking equipment** so that fugitive emissions can be reduced through repairs. A component that is subject to leaks must be monitored at specified, regular intervals to determine whether or not it is leaking. Any leaking component must then be repaired or replaced within a specified time frame. LDAR programs are already mandated in advanced countries and are expected to be mandated by statutory authorities in our country also in near future.

Why Leak detection and Repair (LDAR) programs are needed ?

Fugitive emissions constitute a source of air pollution and fire. EPA has determined that leaking equipment, such as valves, pumps, and connectors, are the largest source of emissions of volatile organic compounds (VOCs) and volatile hazardous air pollutants (VHAPs) from **chemical manufacturing facilities** and from **petroleum refineries** which include acetaldehyde, benzene, formaldehyde, methylene chloride, naphthalene, toluene, and xylene etc.

A benefit of LDAR program is **reduction of product losses**. Facility that apply LDAR also **increase safety** for workers and operators, decrease exposure of the surrounding community, reduce emission fees and help facilities avoid enforcement action.

Sources of Fugitive Air Discharges :

- **Valves** are used to either restrict or allow the movement of fluids. Leaks from valves usually occur at the stem or gland area of the valve body and are commonly caused by a failure of the valve packing or O-ring.
- **Connectors** are components such as flanges and fittings used to join piping and process equipment together. Leaks from connectors are commonly caused from gasket failure and improperly torqued bolts on flanges.
- **Open-ended lines** are pipes or hoses open to atmosphere or surrounding environment.
- **Sampling connections**. Leak usually occur at the outlet of the sampling valve when the sampling line is purged to obtain the sample.
- Leaks from **Compressor seal**.
- **Pressure relief devices** are safety devices designed to protect equipment from exceeding the maximum allowable working pressure. Leaks from pressure relief valves can occur if the valve is not seated properly, operating too close to the set point, or if the seal is worn or damaged.
- Leaks from rupture disks can occur around the disk gasket if not properly installed.

Good Industry Practices

Major steps of LDAR are :

1. **Identification of Components that may leak**
2. **Leak Definition**
3. **Monitoring Components**
4. **Repairing Components**
5. **Record Keeping**

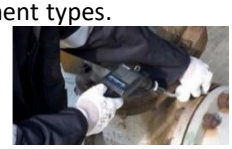
Step 1 : Identification :

- Assigning unique identification number to each component.
- Write the component ID on P&ID.
- Set up and institute an electronic data management system for LDAR data and records.
- Periodically perform a field audit to ensure lists and diagrams accurately represent equipment installed in the plant.
- "Unsafe to monitor" and "Difficult to monitor" components list should also be prepared.

Step 2 : Leak Definition :

- Leak definitions vary by regulation, component type, service (e.g. light liquid, heavy liquid, gas/vapor), and monitoring interval.
- A leak is detected whenever the measured concentration exceeds the threshold standard for the applicable regulation.
- Many equipment leak regulations also define a leak based on visual inspections and observations (such as fluids dripping, spraying, misting or clouding from or around components), sound (such as hissing), and smell.
- Best practice to keep in mind are :
  - ✓ Use a leak definition lower than what the regulation requires; especially when consideration of safety.
  - ✓ Simplify the program by using the lowest leak definition when multiple leak definition exists.
  - ✓ Make the lowest leak definition conservative to provide a margin of safety when monitoring components.
  - ✓ Keep the lowest leak definition consistent among all similar component types.

Step 3 : Monitoring the Components :



- Here distinction must be made between monitoring in order to meet **statutory reporting requirements** for air pollution control and the monitoring that is required for **fire and explosion mitigation**.
- The monitoring interval is the frequency at which individual component monitoring is conducted. The monitoring interval depends on the component type and periodic leak rate for the component type.
- Monitoring interval may vary accordingly to applicable regulation, but are typically weekly, monthly, quarterly and yearly. For connectors the monitoring intervals can be every 2,4 or 8 years.
- As a part of good practices one should **perform QA/QC of LDAR data to ensure accuracy, completeness, and to check for inconsistencies.** Pay attention to the actual measurement practices and try to identify factors that may prevent the instrument from identifying leaks such as
  - ✓ Relying on dirty instrument probes
  - ✓ Leakage from the instrument probes
  - ✓ Not zeroing instrument meter
  - ✓ Incorrect calibration gases used
  - ✓ Not calibrating the detection instruments.
  - ✓ Holding the probe too far away from the component interface.

Step 4 : Repairing Leaking Components :

- LDAR programs that are built around statutory requirements require the repair of leaking components as soon as practicable, but not later than a specified number of calendar days after the leak is detected.

- Initial attempts at repair include :
  - ✓ Tightening bonnet bolts
  - ✓ Replacing bonnet bolts
  - ✓ Tightening packing gland nuts
  - ✓ Injecting lubricant into lubricated packing
- If the repair of any component is technically infeasible without a process unit shutdown, LDAR programs generally allow the component to be placed on the Delay of Repair list, where the ID number is recorded and explanation of why the component cannot be repaired immediately is provided. An estimated date for repairing the component must be included in the record.
- **"Drill and Tap"** method for repairing leaking valves is generally considered technically feasible.
- Good practices are :
  - ✓ Develop a plan and timetable for repairing components.
  - ✓ Make a first attempt at repair as soon as possible after a leak is detected.
  - ✓ Monitor components daily and over several days to ensure a leak has been successfully repaired.

- ✓ Replace problem components with **"leakless" or other technologies.**

Step 5 : Record Keeping :

- Recordkeeping is an important step not simply for meeting statutory requirements, but for maintaining and implementing a proper preventive maintenance program.
- Good industry practices are :

  - ✓ Maintain a list of ID numbers for all equipment subject to an equipment leak regulation.
  - ✓ For valves designated as "unsafe to monitor", maintain a list of ID numbers and an explanation/review of conditions for the designation.
  - ✓ Maintain detail schematics, equipment design specifications (including dates and descriptions of any changes), and P&ID.
  - ✓ Maintain the results of performance testing and leak detection monitoring, including leak monitoring results per the leak frequency, monitoring leakless equipment, and non-periodic event monitoring.

Writing LDAR program specifies the regulatory requirements and facility specific procedures for recordkeeping certifications, monitoring, and repairs. A written program also delineates the roles of each person on the LDAR team as well as documents all the required procedures to be completed and data to be gathered, thus establishing accountability. Some important points to be incorporated are :

- ✓ An overall , facility –wide leak rate goal that will be a target on a process unit by process unit basis.
- ✓ A list of all equipment in light liquid and/or gas/vapor service that has the potential to leak VOCs and VHAPs, within process units that are owned and maintained by each facility.
- ✓ Procedure for identifying leaking equipment within process units.
- ✓ Procedures for repairing and keeping track of leaking equipment
- ✓ A process for evaluating new and replacement equipment to promote the consideration of installing equipment that will minimize leaks or eliminate chronic leakers.
- ✓ A list of "LDAR Personnel" and a description of their roles and responsibilities, including the person or position for each facility that has the authority to implement improvements to the LDAR program.
- ✓ Procedure (e.g. Management of Change program) to ensure that components added to each facility during maintenance and construction are evaluated to determine if they are subject to LDAR requirements, and that affected components are integrated into the LDAR program.
- ✓ Provide all facility employees assigned LDAR compliance responsibilities, such as monitoring technicians, database users, QA/QC personnel, and the LDAR coordinators. Training information and records of contractors if any.

We are pleased to announce our mutual co-operation tie ups with Iranian company for Process Safety Management (PSM) on 15th April 2018

All previous Newsletters are available in download section of our website (www.nexapsm.com).